Before the

Federal Communications Commission

Washington, D.C. 20554

93-61

In the Matter of	)	
	)	
Amendment of Section 90.239 of	)	RM-8013
the Commission's Rules to Adopt	)	
Permanent Regulations for	)	
Automatic Vehicle Monitoring	)	
Systems	)	

TO: The Commission

JOINT COMMENTS ON NOTICE OF PROPOSED RULEMAKING

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SUMMARY

Texas Instruments Incorporated and MFS Network Technologies, Inc. ("TI/MFS") support the adoption of permanent automatic vehicle identification rules to provide needed certainty and stability in the burgeoning ("AVI") market. TI/MFS, however, strongly opposes that aspect of the Commission's Notice in this docket which proposes to carve out the majority of the available spectrum between 902-928 MHz for exclusive use by a single AVI technology -- wideband, pulse ranging systems. TI/MFS believes that the Commission's plan to devote two 8 MHz blocks exclusively to wideband, pulsing systems should be modified to identify a maximum of a single 8 MHz spectrum block for pulsing systems.

The proposed significant set aside for wideband systems does not accommodate the broad diversity of AVI technologies and providers that have proliferated since the Commission first adopted its interim rules. The disparate allocation to pulsing systems artificially and prematurely favors a single AVI technology, at the expense of other numerous innovative, affordable and spectrum efficient AVI technologies, such as the TI Reader Identification System ("TIRIS") AVI technology that will be the basis of numerous intelligent highway systems built by TI/MFS in California and elsewhere.

The allocation proposed in the Notice would effectively relegate all mediumband, tag AVI systems and other non-pulsing technologies to a single shared band of 6 MHz. TI/MFS expects that the proposed allocation scheme, if adopted, will encourage congestion in a "rush to the middle 6 MHz band" by, among others, the several major

companies and states now developing and constructing mediumband, tag systems in large-scale projects across the country. Since the proposed allocation scheme contains no alternative for such systems, there is no flexibility to shift frequencies in the event of conflicts.

The relatively meager spectrum allocation left to mediumband, non-pulsing systems will cast doubt on the long-term viability of such AVI systems and may inhibit such AVI systems from realizing their full potential in the marketplace. An excessive allocation exclusively in favor of pulsing technology will permanently stifle competition in the AVI market, retard innovation, and result in higher consumer prices and fewer benefits. States such as California and others have widely recognized the multiple benefits to mediumband tag systems, such as the TI/MFS TIRIS-based system, and are in the process of implementing these systems. The current proposed allocation scheme

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TO: The Commission

JOINT COMMENTS ON NOTICE OF PROPOSED RULEMAKING

Texas Instruments Incorporated ("TI")and MFS Network Technologies, Inc. ("MFS"), (hereinafter collectively referred to as "TI/MFS"), respectfully submit these joint comments in response to the Commission's Notice of Proposed Rulemaking, released April 9, 1993, in the above-captioned docket, proposing to adopt permanent rules for automatic vehicle identification ("AVI") systems[1/] operating in the 902 MHz to 928 MHz band. TI/MFS supports the adoption of permanent AVI rules, but believes that the proposed allocation is overly and unnecessarily generous in favor of wideband, pulse ranging AVI technology and those who operate such systems. As a result, the proposal also unfairly punishes those who

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1/ As used herein, AVI systems refer to those radio communications systems designed to track vehicles and monitor the status of vehicles. As discussed herein, these systems are also used for traffic management, toll collection, highway and license law enforcement, among other valuable uses. AVI systems can use a variety of radio technologies, such as the wideband pulse ranging technology used by Pactel Teletrac or the modulated backscatter types of systems used by TI/MFS and others.

offer other useful and innovative AVI technologies and the multiple state and private projects that are using or plan to implement those systems. Accordingly, TI/MFS proposes herein an alternative allocation scheme in which, at a maximum, only a single 8 MHz spectrum block, rather than two such blocks, are devoted to exclusive use by wideband, pulse ranging AVI systems. TI/MFS' modified allocation proposal more equitably and rationally distributes the available spectrum resources and better fosters the continued development of diverse, innovative AVI technologies to meet multiple public and commercial needs. As discussed below, the modified allocation plan proposed herein better serves the public interest and should be adopted.

I. BACKGROUND

A. The Texas Instruments and MFS Network Technologies AVI Development Alliance

Texas Instruments, headquartered in Dallas, Texas, is one of the nation's leading high-technology companies with sales and manufacturing operations in more than 30 countries. TI develops, manufacturers and markets semiconductors, defense electronic systems, software productivity tools, computer systems and peripheral products, custom engineering and manufacturing services, electrical controls, metallurgical materials, and consumer electronic products. Among TI's many businesses is the Texas Instruments Registration and Identification System ("TIRIS™"), a highly cost-effective and reliable AVI system that electronically controls, detects, and tracks a variety of items using radio frequency identification ("RFID") technology. TI's North American headquarters for this global business is located in Attleboro, Massachusetts.

MFS Network Technologies, Inc. is a subsidiary of MFS Communications Company, Inc., whose parent corporation, in turn, is one of the world's leading construction companies, Peter Kiewit Sons', Inc. of Omaha, Nebraska. MFS Network Technologies, Inc. is a major telecommunications network and systems integrator and facilities manager. Its parent company MFS Communications Company, Inc. is a leading provider of reliable, high-quality voice, data and video telecommunications systems and services for business and government customers nationwide. Peter Kiewit Sons', Inc., a major worldwide construction and engineering company, is the leading builder of interstate highways in the United States.

TI and MFS have combined efforts in a joint development alliance to develop intelligent highway systems that will pave the way for safer and congestion-free "smart highways" of the next century. Specifically, through this exclusive co-development arrangement, TI has combined its innovative technology with MFS' telecommunications, highway systems integration, and extensive road development experience. This unique combination of experience and expertise has led to a successful intelligent vehicle highway system joint venture through which TI and MFS plan to implement multiple TIRIS™-based systems.

B. The TI/MFS AVI System

Both federal and state governments have recognized the critical need to improve our Nation's transportation infrastructure and the ways in which we use it. Government policymakers and individual citizens understand that improved transportation facilities and management are essential to reducing travel time, air pollution, fuel use and enhancing the

safety and efficiency of our roadways. This, in turn, opens greater access to jobs, schools, and housing.

Through the combined experience and expertise of TI and MFS, these two companies have developed an AVI system that makes these significant benefits a reality. The joint alliance plans to integrate the TIRIS™ technology into advanced electronic toll and traffic management ("ETTM") systems for implementation on highways, bridges, and tunnels nationwide.[2/] The system includes TI's newest TIRIS™ product development, a High Frequency Transponder that is an active (battery-powered) Read-Write tag capable of communicating large amounts of information at very high speeds. The TIRIS™ system is based on modulated backscatter technology by which low level radio frequency signals are omitted from a reader to the tag. The reader signals are reflected back by the tag modulated by information stored in the tag's memory.

Placed on a dashboard or attached to a license plate, the tag, roughly the size of a credit card, carries a unique programmable identification code. As drivers pass under the overhead TIRIS™ radio frequency reader in a designated toll collection area, the system automatically assesses the appropriate charge to either a pre- or post-payment user account maintained by toll agency computers. Through each tag's unique code, the reader can

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[2/] AVI becomes a very powerful tool when it is used in a well-planned and implemented ETTM system. Such a system will reduce congestion and increase throughput by moving cars through toll areas at highway speeds. It can also increase the efficiency of toll collection and enforcement. By supplying large amounts of traffic flow information, a fully functional ETTM system can evaluate current conditions and provide motorists with a variety of alternatives to make their trip faster and safer. The result is less highway congestion, less air pollution and wasted fuel, reductions in traffic accidents, and increases in productivity as more time is spent at work or home rather than wasted while sitting in traffic.

distinguish vehicles travelling in separate lanes within 60 centimeters of each other and can even identify individual motorcycles riding side-by-side in a single lane. The TIRIS™-based system can process a minimum of 2,500 vehicles per lane per hour -- four times faster then any current coin-operated express lane.

California has recognized that AVI systems will deliver significant public benefits, particularly in areas that suffer from severe traffic congestion, and made an early commitment to implementing AVI systems throughout the state. To foster the deployment of AVI systems, the California Department of Transportation ("CALTRANS") developed an AVI specification identifying technical and performance standards that, consistent with the Commission's earlier findings regarding AVI systems, recognizes that more than one AVI system and technology is -- and should continue to be -- available and that the public interest requires that the AVI systems implemented in an area be compatible.

On January 27, 1993, MFS Network Technologies, Inc. announced that it had been selected to provide the ETTM systems for State Route 91 (SR-91) in California, one of the first privately owned toll roads to be built in the United States in decades and one of the first to feature a 100 percent AVI-based ETTM system. MFS plans to deploy the TI/MFS TIRIS™-based AVI system on SR-91. In addition to toll collection, the SR-91 ETTM system includes technology that offers complementary services such as video recording of illegal vehicle license plates and variable message signs to advise motorists of highway conditions. TI and MFS are currently bidding on tollroad, bridge and other projects nationwide with systems incorporating TIRIS™ technologies. Additional detail describing the SR-91 project is included in the materials attached hereto as Attachment "A."

C. The Commission's Proposal for Permanent AVI Rules

The Commission proposes in its Notice to adopt permanent AVI rules in response to a Petition for Rulemaking filed on May 28, 1992, by North American Teletrac and Location Technologies, which operate several AVI systems through their joint venture with Pactel Teletrac (hereinafter collectively referred to as "Pactel"). Pactel holds several Commission licenses granted under the existing interim Part 90 AVI rules for wideband, pulse ranging AVI systems using 8 MHz spectrum blocks.

In first considering emerging AVI technologies in its 1974 rulemaking proceeding, the Commission concluded that AVI technologies promise to deliver substantial public benefits, but that the technology and market had not matured sufficiently to adopt permanent AVI rules. Accordingly, in that proceeding, the Commission determined to authorize AVI systems but wisely refrained from adopting rules that would artificially limit the future of AVI by locking in a single AVI technology. The Commission's interim rules identify two 8 MHz bands (904-912 MHz and 918-926 MHz) for interim use for wideband, pulse ranging systems. Narrowband systems have had access to the 903-904 MHz and 926-928 MHz bands. See 47 C.F.R. § 90.239 (1992).

As initially contemplated by the Commission in 1974, AVI technologies have continued to develop. In the ensuing 19 years, a diverse range of technologies have proliferated. Prominent companies such as TI and MFS have brought their considerable talents, resources and expertise to bear in developing innovative AVI technologies and systems. Federal and state governments have recognized the enormous potential public benefits of AVI systems and have undertaken programs to implement AVI systems on

highways, bridges, tunnels and with other modes of transportation. Against this background, it is TI/MFS' interest in this proceeding to ensure that the permanent AVI rules that may be adopted adequately accommodate the existing variety of AVI systems and continue to encourage the proliferation of new AVI technologies and providers.

In its May, 1992 Petition, Pactel urged the Commission to designate permanently a large portion of the 902-928 MHz band to wideband, pulse ranging systems with a limited allocation to narrowband and mediumband systems. Specifically, Pactel proposed that the Commission allocate two 8 MHz spectrum blocks to wideband, pulsing systems, limit narrowband systems to a much smaller area (of 10 MHz of noncontiguous spectrum), and expressly prohibit narrowband systems from operating in the two 8 MHz spectrum blocks set aside for wideband systems. Significantly, the Pactel proposal also contemplates that the two 8 MHz wideband blocks will be allocated exclusively between Pactel and to one other chosen wideband licensee.

The Commission largely agreed with Pactel's plan and adopted Pactel's proposal, with some modification, as the basis for the Notice in this proceeding.[3/] In the Notice, the Commission accepts the view that wideband systems cannot live with interference from narrowband systems and, therefore, for a given regional market an 8 MHz block free of such interference must be set aside for wideband systems. Concomitantly, the Commission

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3/ Comments and reply comments were filed on Pactel's Petition. See Public Notice, Rept. No. 1897 (released June 23, 1992). TI/MFS are filing these joint comments at this time because the TIRIS™ technology (and the TI/MFS AVI alliance) has fully developed into a commercial product since the pleadings were filed on Pactel's Petition -- a cogent illustration of the rapid pace of AVI technology and market development.

relegates narrowband and mediumband systems to share the remaining 10 MHz of noncontiguous spectrum.

The Commission did not adopt all of Pactel's proposals, however. Significantly, the Commission rejected Pactel's request for a rule establishing exclusive licensing of the 8 MHz blocks to specific operators. Indeed, in rejecting Pactel's proposal to authorize exclusive wideband licenses, the Commission said "we believe it possible for wideband pulse ranging systems to operate on a non-exclusive basis . . . non-exclusive licensing of LMS systems is the best means to promote competition within the LMS industry and continued technological advances in LMS services."[4/] As discussed in detail below, TI/MFS firmly believes that the public interest requires that the proposal set forth in the Notice be modified to authorize a maximum of only one, rather than two, 8 MHz blocks for wideband, pulse ranging systems.

II. THE PROPOSED ALLOCATION IS OVERLY GENEROUS IN ALLOCATING TWO 8 MHZ SPECTRUM BLOCKS EXCLUSIVELY TO WIDEBAND PULSING SYSTEMS AND SHOULD BE MODIFIED TO BETTER ACCOMMODATE NARROWERBAND TAG SYSTEMS

TI/MFS strongly supports the adoption of permanent AVI rules. TI/MFS agrees with the Commission and with the view of other parties, including Pactel, that the interim rules should be replaced with permanent rules that provide a competitive and dependable

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4/ Notice at para 21. The Commission proposed two alternative approaches to licensing wideband systems. Wideband licenses could be granted on a non-exclusive basis in the two 8 MHz bands requiring the licensees to perform any necessary frequency coordination. In the alternative, the Commission would protect the existing wideband licensees or the first two licensees in currently unlicensed markets for 5 years. During the 5-year period, new applicants would be licensed only on the basis of 110 mile co-channel mileage separation.

environment in which innovative AVI systems can develop.[5/] Nonetheless, in the process of adopting permanent AVI rules, the Commission should not lose sight of the public interest need to accommodate the diverse AVI technologies that have already proliferated, foster continued development and innovations in AVI technologies, and permit a fully competitive market to flourish.

In particular, TI/MFS opposes the proposal to set aside two 8 MHz bands -- 60% of the available AVI spectrum -- exclusively to wideband, pulse ranging AVI systems. In TI/MFS' view, the proposed total allocation of 16 MHz for the use of a single AVI technology is overly generous and is not justified by either the record in this proceeding or the Commission's own public policy objectives.

A. An Allocation of Two Wideband Pulse Ranging 8 MHz Spectrum Blocks is Contrary to the Commission's Policy Against Exclusive Wideband Licenses

TI/MFS believes that the Commission was correct when it expressed its public interest concerns regarding the dangers of granting an exclusive license to Pactel or any other wideband pulsing system operator.[6/] This view was also echoed by several of the commenters in opposition to the initial Pactel Petition. Those commenters made clear that adopting an exclusive wideband license scheme would permanently stifle competition in the AVI market, retard innovation, and result in higher consumer prices.

[5/] Notice at para. 5. TI/MFS anticipates that by adopting permanent AVI rules, the Commission can foster greater investment and development in AVI technologies and systems.

[6/] Notice at para. 21.

Given the important public interest in maintaining nonexclusivity, however, TI/MFS also believes that there is a logical inconsistency in the Commission's plan to reserve two separate 8 MHz spectrum blocks exclusively for wideband pulsing systems. Specifically, the Commission indicates that wideband pulsing system operators can and should learn to share the allocated 8 MHz channel. The Commission states that "we believe it is possible for wideband pulse-ranging systems to operate on a non-exclusive basis, albeit with cooperation among co-channel licensees serving the same area."[7/]

As discussed above, TI/MFS strongly supports the Commission's commitment to authorizing -- and encouraging the entry of -- more then two wideband operators in a specific area. Given the Commission's commitment to nonexclusivity and sharing in the 8 MHz blocks, however, there is no regulatory, practical or public interest justification to set aside two separate 8 MHz blocks -- almost 60 percent of the available spectrum -- solely to wideband pulsing systems.

The inconsistency of the position is best illustrated in comments filed by supporters of Pactel's Petition. Ameritech, through its MobileVision entity, argues in support of the creation of two 8 MHz channels that:

> Furthermore, permanent rules should provide for co-channel separation between wideband AVM licensees within well-defined geographic service areas. Two wideband pulse ranging systems located in the same service area cannot co-exist on the same 8 MHz. The two systems would inevitably interfere with one another rendering both systems inoperable.[8/]

[7/] Id.

[8/] Comments of Mobilevision, July 23, 1992 at ii.

The Commission correctly rejected this position, but still allocated a total of 16 MHz to wideband pulsing systems.

B. The Commission Should Modify Its Allocation Proposal to Better Accommodate Narrowerband Tag Systems As Well As Wideband Systems

TI/MFS seeks a resource allocation that permits both wideband pulsing systems and narrowerband tag systems to co-exist and thrive. Both technologies deserve a chance to develop and allow the marketplace to drive technological innovation, product availability, and lower consumer prices. Neither technology should be prevented from developing due to regulatory constraints, unless those restraints are necessary.

TI/MFS fervently believes that an allocation of a single 8 MHz band for wideband pulsing systems is more than sufficient to accommodate currently operational wideband systems and permit future development and innovation in wideband technology. The proposed allocation goes a long way to protect the interests of the proponents of wideband pulsing technology, but shortchanges the narrowerband systems. TI/MFS recognizes that the Commission has determined that wideband pulsing systems may be sensitive to interference from narrowband systems and therefore does not oppose an appropriate allocation of spectrum exclusively to such systems.[9/] A modified allocation plan for a single 8 MHz block, at a maximum, would allow at least two, and likely more, wideband pulsing

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[9/] TI/MFS notes, however, that there is some question regarding whether this interference problem is inevitable or results primarily from Pactel's failure to use known and reasonably inexpensive techniques, such as spread spectrum and pulse compression, to increase the immunity of its system.

system operators to be licensed in each geographic market, thus ensuring ample opportunity for wideband competition.[10/]

TI/MFS specifically proposes that the Commission modify its plan by allocating either the 902-910 MHz, or 904-912 MHz bands to wideband pulsing systems. This proposed allocation creates one 8 MHz block in which wideband systems would be free of interference from narrowband systems. The remainder of the 902-928 band should be left open for the shared use of narrowerband systems (medium and narrowband systems) consistent with the existing shared environment. While TI/MFS recognizes that future uses, including the emerging market for Part 15 low power products, such as spread spectrum personal communications services telephones, could create spectrum congestion and increase the potential for interference in the future, TI/MFS believes that it is premature to consider at this time allocating the remaining band beyond that allocated to wideband pulsing systems.

The public interest is best served by an AVI allocation scheme that fosters development of the widest possible range of technologies and entry of multiple providers. TI/MFS does not question that wideband pulsing systems offer benefits to society. TI/MFS also recognizes that Pactel has expended funds, built systems, and is currently operating in six markets. By proposing a maximum of a single 8 MHz band, therefore, TI/MFS does not seek to prevent the operation or growth of wideband pulsing technology. In that vein,

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[10/] If a limit on the number of licensees proves necessary in order to manage the problems of interference from other wideband pulsing systems, then the Commission could address that issue by limiting the number of available licenses through a cap or more creative arrangements such as a lottery system.

TI/MFS strongly agrees with the sentiment expressed by the Commission that the goal in allocating the available public resource is to create an environment where "wideband pulse ranging systems can effectively co-exist with narrowband systems." Instead, TI/MFS opposes the excessive allocation of a valuable public resource to a single technology, particularly when it will be done at the expense of other valuable technologies. Both wideband pulsing systems and narrowerband tag systems have much to offer and both should be given a reasonable opportunity to realize their potential in the marketplace.

III. THE PROPOSED ALLOCATION WILL ADVERSELY AFFECT THE IMPLEMENTATION OF INTELLIGENT VEHICLE HIGHWAYS SUCH AS THOSE BEING PROMOTED BY THE CALIFORNIA DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS FOR AVI

As noted by several of the commenters in opposition to the original Pactel Petition, it is the expressed policy of the United States government to promote the development of intelligent vehicle highways. Both federal and state policymakers recognize that intelligent vehicle highways systems will deliver substantial public benefit such as reduced pollution, reduced fuel consumption, reduced commuting time, greater access to urban centers and jobs, increased state revenues and an overall improved quality of life for Americans fortunate enough to live in an area that has deployed AVI systems. The State of California, which suffers from a significant share of the Nations' most congested highways, has taken a leadership role in attempting to implement intelligent vehicle highways.

In TI/MFS' experience a market for emerging technologies often develops only after standards have been established that allow all manufacturers to produce compatible

equipment.[11/] Progressive government agencies often are the catalysts that prompt this type of necessary standardization. In the case of intelligent vehicle highways, CALTRANS has taken on such a role. CALTRANS has enacted regulations, the Compatibility Specification for Automatic Vehicle Identification Equipment, Cal. Code of Reg., Title 21, Chapter 16, Art. 1-4, which call for operations in the 915 +/- 13 MHz band (subject to FCC assignment) generally requiring 6 MHz per channel.[12/]

TI/MFS believes that the allocation scheme proposed in the Notice, if adopted, will seriously undermine the long-term viability of innovative, cost-effective mediumband AVI technologies such as those deployed under the California specification. Under the proposed allocation in the Notice, a single band of 6 MHz would be suitable for use by the TIRIS™ and other mediumband ETTM systems. As noted by parties commenting on the initial Pactel Petition, if the Commission's allocation proposal is adopted, there will be a "great rush to the middle." That is, AVI developers and licensees operating nonpulsing systems and who would require more than 2 MHz will strive to locate their AVI systems in the middle 6 MHz block of spectrum. Indeed, given the Commission's proposed allocation scheme of 2-8-6-8-2 MHz in the 902-928 MHz band, there is simply no alternative to the middle 6 MHz band for mediumband nonpulsing systems. This scheme will not only result in a waste of the 4 MHz of band divided into 2 MHz at the extreme ends of the band, but will also create serious problems in the future as the middle of the band quickly becomes

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11/ Evidence of this phenomena is seen in the history of most technology, from radio to television to computers to VCRs and future products like high definition television.

12/ The California specification defines transmission and modulation schemes for AVI systems to be used within California.

congested by multiple mediumband systems and non-AVI services. The limited 6 MHz allocation leaves no flexibility to shift frequencies in the case of conflict and therefore artificially and severely limits the potential for AVI technology other than wideband, pulse ranging systems.

The congestion in the 6 MHz block encouraged by Commission's proposed allocation plan will cast considerable doubt on the extended utility of ETTM systems that rely on the use of that band. TI/MFS estimates that currently there are at least one half dozen major telecommunications and technology companies that have developed mediumband, nonpulsing AVI systems, are bidding on large scale projects throughout the country, and expect to be fully in the market by as early as 1994.[13/] These companies, along with the various state and local AVI programs supporting their projects, are pursuing the specific public benefits of mediumband AVI technologies. Commission action that leaves only 6 MHz of usable spectrum for these AVI technologies, however, will inject substantial uncertainty into the future of these AVI technologies, contrary to the Commission's stated goal of bringing greater certainty to the AVI area as a foundation for future growth and innovation.

While TI/MFS recognizes that, in developing permanent AVI rules, the Commission is not bound by a decision of CALTRANS or the plan of any other state agency, TI/MFS urges the Commission to give serious consideration to proposing an allocation and permanent rules that would minimize the cost, difficulty, and other adverse effects to the

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[13/] TI/MFS understands that Hughes, Lockheed, Motorola, AT&T and Mark IV, among others, are pursuing such projects.

projects in California and the similar projects underway throughout the country to those companies, including TI/MFS, that are implementing AVI technology other than wideband, pulse ranging systems. TI/MFS wishes to point out that this is not a narrow issue limited to one state's plans for one highway.[14/] SR-91, with its awarded $100 million development contract which includes in excess of $17 million worth of ETTM equipment and transponders (if all of the equipment options are exercised), is not the only project threatened. California is in various stages of planning and implementation for other intelligent vehicle highway systems on other highway routes, as well as in a series of bridges and tunnels. Some of those systems are projected to be completed by 1994. All of those systems follow the specification issued by CALTRANS.

Many other government authorities and private road builders are also interested in promoting and developing these mediumband modulated backscatter technologies.[15/] Through the TI/MFS joint development arrangement, TI and MFS are in the process offering its mediumband TIRIS™-based tag technology in numerous other states that are

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[14/] The Federal Highway Administration believes "that development of compatible AVI equipment would be a definite benefit to the industry and toll facility users." Letter from Dennis C. Judycki, Associate Administrator for Safety and System Applications, U.S. Department of Transportation, Federal Highway Administration to David R. Slinger, TIRIS™ General Manager, dated May 26, 1993.

[15/] Presently, efforts are underway at the University of California Lawrence Livermore National Laboratory and the National Institute of Standards and Technology to examine issues of AVI compatibility.

following similar specifications for use on their highways, bridges, tunnels and with other modes of transportation.[16/]

Delay of the construction of intelligent vehicle highways, such as SR-91 in California, has certain societal costs. The Intelligent Vehicle Highway Society of America ("IVHS America") estimates that the annual cost of traffic congestion to the Nation in lost productivity alone is over $100 billion. While not all of the $100 billion can be attributed to congestion due to toll collection, some of it certainly can. Assuming a conservative 0.1% of this $100 billion total is due to congestion caused by toll collection on California's nine bridges, an estimated $100 million dollars annually could be attributed to congestion.[17/] The use of electronic toll collection equipment will allow existing highways, such as SR-91, to be modified to relieve such congestion. These types of productivity savings, in areas of the country like California that are already suffering from weakened economic conditions,

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16/ TI/MFS estimates that Commission adoption of a limited allocation for mediumband, nonpulsing systems would cause these states to reassess the technical direction of ongoing and future AVI projects and could prompt a change to the existing standards followed in these state projects. Any significant change in existing standards would likely delay ETTM system introduction by up to two years, assuming one year for state agencies to modify their standards to conform to the new FCC allocation rules and a subsequent nine months to complete any necessary engineering changes. For TI/MFS alone, a substantial change in the state specifications arising from new allocation rules could add up to $750,000 in development expenses at a minimum.

17/ In fact, this prediction may be a very conservative estimate given that California's nine bridges handle approximately 25% of the nation's bridge traffic. California's nine bridges (San Francisco - Oakland Bay Bridge, San Matao - Hayward Bridge, Dumbarton Bridge, Carquinez Bridge, Benicia - Martinez Bridge, Antioch Bridge, Richmond - San Rafael Bridge, Vincent Thomas Bridge, and San Diego - Coronado Bridge) were crossed by 224 million passenger cars in 1990. This figure represents 26% of the United States

will have a significant impact on the Nation's economic health. Accordingly, delays or setbacks in implementing and deploying ETTM equipment will have a direct and significant effect on the ability to recover this lost productivity.

V. CONCLUSION

The current proposed allocation unfairly sets aside more band then is necessary for the effective development of wideband pulsing systems and leaves an insufficient band for the full development and operation of narrowerband systems. All mediumband nonpulsing AVI technologies will be confined to a meager 6 MHz of bandwidth. That limited mediumband allocation cannot adequately accommodate the multiple providers in this area and major mediumband modulated backscatter projects ongoing and planned throughout the country. The proposed allocation will inhibit innovation and competition in AVI systems thus severely reducing the likelihood that the public will be able to fully realize the benefits of AVI systems.

The alternative allocation proposed herein represents a for more equitable and rational allocation of this resource. Under the TI/MFS modified scheme, wideband pulsing system operators are granted a 8 MHz block free of interference from narrowerband systems. In return for this exclusivity and grant of a significant amount of bandwidth, narrowerband systems will have the shared use of the rest of the available spectrum.

For these reasons discussed herein, TEXAS INSTRUMENTS INCORPORATED and MES NETWORK TECHNOLOGIES, INC. respectfully request that the Commission

block allocation for pulsing, wideband systems permitting the remainder of the 902-928 MHz spectrum to be shared by narrowerband AVI systems.

Respectfully submitted,

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ATTACHMENTA

6 Video cameras linked by a fiber-optic line along the tollway's length enable